Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
Physics Division – Theoretical Physics Group
Building 50A • Room 3115
(510) 486–4488
FAX 486- 6808

October 4, 1991

Professor David Lewis
Department of Philosophy
Princeton University
Princeton, N.J. 08540

Dear Professor Lewis,

After a long busy time I have finally had an opportunity to look at the argument given in your letter to Bedford and me of April 11 of this year. The issue is whether, in an indetermistic setting, the following statement is an expression of an idea that there is no faster-than-light influence of any kind: If under condition A' the result in region B is B then 'if it were that A, it would (still) be that B'.

The part of this statement set off in quotation marks is your statement (1), which appears on page 2 of your letter. You confirm that the above full statement, which is the locality assumption used in the paper of Bedford and myself, is indeed, as we had claimed, valid within your theory.

To come to grips with the ideas of Redhead you say:
"Now if we assume that the goings on outside the cone (i.e., outside the forward light-cone from region A) are indeterministic then B wasn't inevitable; there was some chance (that is, there is non-zero physical probability) of getting some alternative history, instead of B, outside the cone. And just as this is true in actuality so it would still have to be true if it were that A. So we have another counterfactual:

If under condition A' the result in region B is B then 'if it were that A, there would be some chance that not-B'. "

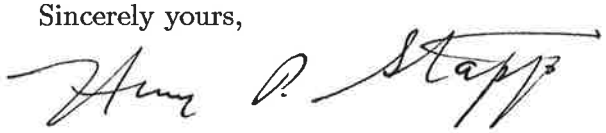
You accept also this second statement. However, the argument by which it is justified does not seem to be sound. You say that just as there was some chance of getting not-B in the actual world so must there be some chance of getting not-B if A were chosen instead of A'. But the major premise is that in the actual world, where A' is chosen, the result is definitely B. Hence in the actual world there is, under the condition imposed by the major premise, no (longer any) chance that not-B. Thus there appears to be no reason to accept your statement (2). In fact, if one consistently adheres to the locality principle expressed by (1), namely that 'if A were chosen, that would make no difference to anything outside the cone', then one must conclude that, just as in the actual case A', so also under condition A, there is (under the condition imposed by the major premise) no (longer any) chance that not-B. Thus it appears to me that: (i), you are not logically required to accept (2); (ii), there is no intuitive reason to do so; and (iii), for consistency with the locality idea expressed by (1) you should in fact deny (2).

Denying (2) removes the trouble in denying also (3), and hence denying the Redhead axiom:

If under condition A' the result in region B is B then 'if A, the result in region B might be not B'.

Redhead is, of course, free to invent alternative logical systems, if they can be made consistent. But the basic requirement on a suitable framework, in the context of an analysis of the significance of Bell's theorem, is precisely that it permit the formulation of the physicist's locality idea that the choice made by the experimenter in region A can 'make no difference to anything whatever outside the cone'. Your theory allows this physical idea to be expressed in ordinary language. On the other hand, Redhead's axiom is essentially a denial of the locality idea that there is no faster-than-light influence of any kind: it directly contradicts the idea that the experimenter's choice in region A can 'make no difference to anything whatever outside the cone.' Thus the Redhead framework is, from the outset, not a suitable framework for the analysis of this locality idea, and, in particular, of its compatability with quantum theory.

Sincerely yours,



Henry P. Stapp

cc: Redhead, Butterfield, Clifton, and Bedford